IN THE SPECIFICATION

Please amend the specification as follows, with all references to the herein submitted English-language translation of the international patent application.

Page 1, amend the paragraph in lines 12-17 as follows:

Conventionally, in order to make a human have a sense of affinity for a humanoid robot or an animal-type robot simulating an animal other than a human (hereinafter, simply referred to as a "robot") which ~~are~~ is an actual object, there have been ~~attempted methods~~ methods attempted to give the robot an appearance similar to an actual human or animal (hereinafter, referred to as a "human or the like").

Pages 1-2, amend the paragraph extending from page 1, line 18 to page 2, line 3 as follows:

Specifically, they include a method to cover the robot with an outer skin formed by a soft material (first method), a method to project a face of a human or the like on the head portion of the robot (second method), a method to coat the surface of the robot by a retroreflector material and project an image of the entire body of a human or the like from an image projecting device using the surface of the robot as a screen (third method), and the like. These methods can make an observer feel as if the robot is a real human or the like, and reduce a sense of strangeness ~~against~~ of the robot. The third method is disclosed in "*Virtual Reality No Kiso 4, Jinkougenjitukan No Hyouka* (the basics of virtual reality 4, evaluation of artificial reality) (supervising editor: Akira Tachi; editor: Toru Ihukube; publisher: Kabushiki-gaisha Baihukan; first edition is published on February 29, 2000)."

Page 2, amend the paragraphs in lines 4 - 26 as follows:

However, in the first method, the robot needs to have facial expressions to be close to a real human or the like. To have ~~the~~ facial expressions, the robot needs to have many actuators so that the surface of the face of the robot can freely move. Consequently, it ~~brings up~~ results in an increase in ~~a~~ the cost of the robot and a complication of controlling the actuators. In addition, since the robot imitates an appearance by ~~the~~ having an outer skin, there is a limit that the appearance of only one type of ~~the~~ human or the like can be provided.

Further, in the second method, since the face of the human or the like is projected on a display provided on the head portion of the robot, it becomes unnatural unless an observer views the robot ~~at~~ from the front. Specifically, when the observer views the robot from ~~a~~ the side or ~~the~~ back, it can be only seen as an appearance of a robot.

Moreover, in the third method, when there exists some kind of obstacle between the robot and the image projecting device, the shadow of this obstacle will be reflected on the surface of the robot. Therefore, in such a case ~~also~~, it is difficult for the observer to recognize the robot as a real human or the like. Further, the observer cannot even touch the robot because his/her shadow will be reflected when he/she ~~come~~ comes close to the robot.

Accordingly, to solve ~~such~~ the above problems ~~as above~~, a method is conceivable in which a head mount display (hereinafter, referred to as "HMD") is worn by an observer, and computer graphics in conjunction with movement of a robot are projected on the HMD to be superimposed on the robot.

Page 3, amend the paragraphs in lines 1 - 18 as follows:

According to this method, the computer graphics of the human or the like can be freely changed corresponding to the robot. Consequently, facial expressions and postures of the robot can be freely and easily moved. Further, by making the computer graphics of the human or the like as three dimensional computer graphics, the observer will not feel unnatural even when viewing the robot from ~~a~~ the side or ~~from the~~ back. Further, the HMD is a ~~display of a~~ goggle type display which covers eyes of the observer and projects the computer graphics in front of the eyes of the observer. Consequently, the shadow of an obstacle will not be reflected on the HMD. Moreover, the observer can also touch the robot, so that the observer can experience the virtual reality in visual and tactile ways. Therefore, the observer becomes able to feel a much stronger sense of affinity for the robot.

However, the method to project computer graphics on the HMD as described above also has problems. In order to change computer graphics of a human or the like to be projected on the HMD in conjunction with movement of a position or a posture of the robot, it is ~~needed~~ necessary to calculate space coordinates based on various data detected by sensors on the robot side or HMD side to perform image processing.

Page 4, amend the paragraph in lines 3 - 10 as follows:

On the other hand, such a displacement between the robot and the computer graphics as described above can be reduced by increasing the accuracy of image processing and the speed of image processing by enhancing the performance of the various sensors, robot and HMD. However, it is impossible to completely eliminate the displacement. Further, mounting high-

performance sensors, CPU, and so on in the robot for minimally reducing the displacement leads to ~~the~~ an increase in cost, which will be a disadvantage in the economical aspect as well.

Page 17, amend the heading in line 25 as follows:

~~Best Mode for Carrying out the Invention~~ Detailed Description of the Invention

Page 19, amend the paragraph in lines 7 - 16 as follows:

The communication unit 12 receives respective data sent from the respective sensors 11a, 11b, and 11c, and receives data from the HMD 2. The data sent from the HMD 2 is a posture data of a head portion of a human (head posture data) measured by the sensor 21b in the HMD 2. The communication unit 12 is a component which sends data from all of these sensors 11a, 11b, and 11c to the relative position posture calculating unit 13. Incidentally, in this embodiment, the data communication between the humanoid robot 1 and the HMD 2 is assumed to be performed wirelessly via an antenna (not-shown), but the data communication is not limited to this, which may be one performed ~~wiredly~~ via a cable.

Pages 19-20, amend the paragraph extending from page 19, line 17 to page 20, line 4 as follows:

The relative position posture calculating unit 13 ~~is a component which~~ calculates data of target angles of respective joints so that the humanoid robot 1 takes a predetermined posture, based on the data detected respectively by the sensors 11a and 11b among the data sent from the communication unit 12. Further, the relative position posture calculating unit

13 ~~is a component which~~ obtains a posture of the humanoid robot 1 and a relative positional relationship between the humanoid robot 1 and the HMD 2 based on all the data (body surface contact pressure data, joint angle data, relative distance information and head posture data) sent from the communication unit 12, calculates from these information relative position posture data that is a shape of the humanoid robot 1 to be projected in a visual range of the observer who is wearing the HMD 2 and viewing the robot 1, and sends data for generating computer graphics to the image processing unit 15.

Page 20, amend the paragraph in lines 5 - 22 as follows:

The joint actuator 14 is a drive mechanism which changes angles of respective joints based on target joint angle data calculated by the relative position posture calculating unit 13. The image processing unit 15 is constituted by an image generating unit 15a that is one aspect of an image generating device, a nimbus generating unit 15b that is one aspect of a nimbus generating device, and a combined image generating unit 15c that is one aspect of a combined image generating device. The image processing unit 15 reads data of human computer graphics stored in the storage unit 16 based on the relative position posture data calculated in the relative position posture calculating unit 13, performs respective processing of image generation, outline extraction, nimbus generation and image composition on the data of the human computer graphics to thereby generate a combined image (= processed computer graphics data). Here, the outline extraction is performed in the image generating unit 15a. The image processing unit 15 is generally constituted by a central processing unit

(CPU), an image processing processor, and a memory, but it may be a hardware configuration other than this. ~~Incidentally, details~~ Details of processing operation of the image processing unit 15 will be described later.

Page 22, amend the paragraph in lines 2 - 3 as follows:

Next, image processing of the humanoid robot 1 will be described ~~based on~~ with reference to FIG. 4 to FIG. 8.

Page 26, amend the paragraphs in lines 6 - 17 as follows:

Incidentally, the image processing device of the present invention is expected to be utilized ~~in~~ for various ~~use~~ uses other than toy-like ~~use~~ uses. Specifically, first, by reproducing data of human computer graphics of a performing artist who is the user's favorite, it can be enjoyed as a three-dimensional poster for virtually contacting the performing artist. Moreover, by mounting a conversation device in the humanoid robot 1, it can be a quite effective advertising medium.

Further, it is conceivable that the user enjoys a walk, sports, or the like with the humanoid robot 1. Further, it is conceivable that, by saving data of one's own human computer graphics before his/her death, it can ease the family's sorrow after his/her death. Moreover, it is also expected to be utilized in caring a patient or an elderly person or ~~in~~ for a welfare purpose.

Page 27, amend the paragraph in lines 16 - 25 as follows:

FIG. 9 is a pinhole camera model of human vision. When the origin 0 (zero) is equivalent to the center of a lens, and a true distance from the origin 0 (zero) to an object 50 that is the target point is l (ell), it is supposed that the measurement value of the sensor including an error is within "l (1 ± α)." A visual angle taken in a visual field by the object 50, which exists at the distance l and has a width w, is "2 θ real". In this case, by projecting computer graphics 51 having a width equivalent to the visual angle "2 θ real" on a display unit of the HMD 2, the object 50 can be hidden by the computer graphics 51. Incidentally, in the retina of a human, computer graphics 52 having the width equivalent to the visual angle "2 θ real" is reflected.

Page 34, amend the paragraph in lines 10 - 16 as follows:

One of the differences between the fourth embodiment and the ~~precedent~~ preceding embodiments is that the fourth embodiment has a lacking area represented by a hole or a dented portion so that an observer can observe the second actual object through the computer graphics superimposed on the humanoid robot 1. Further, another difference between the fourth embodiment and the ~~precedent~~ preceding embodiments is that a nimbus is also generated around the periphery of the above-described lacking area of the above-described computer graphics.